PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04Q 7/22 — A1

(11) International Publication Number: WO 00/30379

(43) International Publication Date: 25 May 2000 (25.05.00)

(21) International Application Number: PCT/US99/26045

(22) International Filing Date: 4 November 1999 (04.11.99)

(30) Priority Data:
09/195,374 18 November 1998 (18.11.98) US

(71) Applicant: ERICSSON, INC. [US/US]; 7001 Development Drive, Research Triangle Park, NC 27709 (US).

(72) Inventor: IRVIN, David, R.; 1546 Iredell Drive, Raleigh, NC 27608 (US).

(74) Agent: BENNETT, David, E.; Coats & Bennett, P.L.L.C., P.O. Box 5, Raleigh, NC 27602 (US).

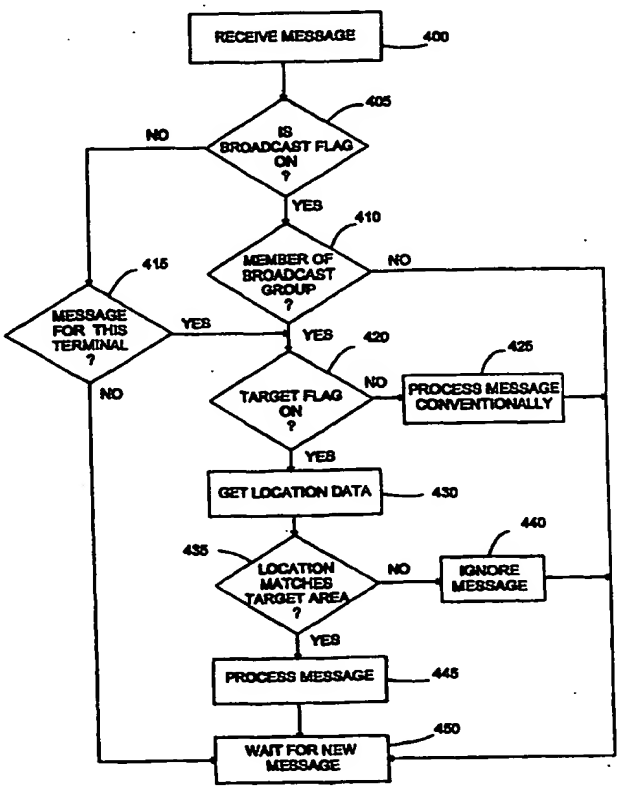
(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: METHOD AND APPARATUS FOR LOCATION BASED TARGETING OF MESSAGES TO COMMUNICATION TERMINALS

(57) Abstract

To improve the geographic resolution of broadcast messages transmitted over a communication network, such as a cellular telephone network, the originator of a message specifies a target area of reception. The target area of reception is compared to location data usually representing the terminal location. When the location data matches the target area of reception, the terminal accepts the message; otherwise, the terminal does not accept the message. In one embodiment of the invention, location data is determined by a positioning receiver and loaded into a register. In another embodiment, the location data is loaded into the register by manual keypad entry or by transmission over the network, so that the location data can define a location of interest other than the terminal's current geographic location, or so that terminal location data can be provided for communication terminals that lack a positioning receiver.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania
AM	Armenia
AT	Austria
AU	Australia
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CU	Cuba
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GH	Ghana
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgyzstan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakstan
LC	Saint Lucia
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
MK	The former Yugoslav Republic of Macedonia
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
MX	Mexico
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SK	Slovakia
SN	Senegal
SZ	Swaziland
TD	Chad
TG	Togo
TJ	Tajikistan
TM	Turkmenistan
TR	Turkey
TT	Trinidad and Tobago
UA	Ukraine
UG	Uganda
US	United States of America
UZ	Uzbekistan
VN	Viet Nam
YU	Yugoslavia
ZW	Zimbabwe

METHOD AND APPARATUS FOR LOCATION BASED TARGETING OF MESSAGES TO COMMUNICATION TERMINALS

Field of the Invention

The present invention relates generally to methods for broadcasting messages on a communication network, and more particularly to improved method and apparatus for selectively targeting broadcast messages based upon geographic criteria.

Background of the Invention

In a traditional telephone system, a calling party or originator can establish a connection with a called party or recipient. Beyond the basic point-to-point connection provided by the traditional telephone system, modern communication networks that employ digital technology often provide broadcast capability. A message known as a broadcast message can be sent from an originator to a group of intended recipients rather than a single recipient. For example, digitally encoded alphanumeric messages such as news reports or advertisements may be sent as broadcast messages to all mobile communication terminals currently registered with a cellular telephone system.

By using a network's broadcast capability, an originator needs to send only one message in order to reach a plurality of recipients. Thus, the originator is relieved of the burden of sending a multiplicity of individual messages to the recipients, one by one. Moreover, the use of broadcast messages also relieves the network of the burden of carrying a flurry of messages addressed to individual terminals – a flurry sometimes called a storm – and thereby avoids wasting the network's capacity.

In recognition of these advantages, today's operational standards for modern digital cellular telephone systems such as TIA Standard IS-136 provide broadcast capability. Although broadcast capability is clearly a valuable provision, not all users of a given communication network necessarily have an interest in receiving all broadcast messages sent over that network. For this reason, various ways have evolved for narrowing the list of intended recipients of a broadcast message. One of these ways is to form broadcast groups. A broadcast group might, for example, consist of a community's volunteer firefighters. Firefighters have interest in receiving a certain subset of broadcast messages that are not necessarily relevant to the entire population.

Using broadcast groups, the particular population can be targeted to receive a broadcast message. The intended recipients are identified by a broadcast group code carried by the message. By interpreting the broadcast group code, a communication terminal that receives a broadcast message can determine whether or not to accept that message. By selectively accepting broadcast messages, the communication terminal can shield its user from information clutter that might otherwise result from indiscriminately accepting all broadcast messages. Furthermore, accepting broadcast messages selectively rather than indiscriminately enables portable communication terminals to conserve their battery and processor resources.

The operation of broadcast groups requires that group memberships be managed, which is to say that members need to be added and dropped from various broadcast groups as interests change. Interests can change frequently in the case of a wireless network such as a cellular telephone network, particularly in concert with changes in the users' geographic locations. For example, messages concerning traffic

accidents and congestion, or messages concerning the availability of gasoline and restaurants, have interest only to a group of users that are mobile, transient, and geographically defined. Conversely, the group of users interested in severe-weather alerts changes in response to the track of a storm, even though the users themselves might well be stationary. In either situation, however, broadcast group membership must be managed actively in order to avoid troubling a large body of network users with information that benefits only a few. So, although the introduction of broadcast groups represents a clear step forward in narrowing the intended audience for broadcast messages, the requirement to manage broadcast groups constitutes a significant limitation in the context of groups that have a rapidly changing membership based on geographic considerations.

In response to this limitation, broadcast messages sent by cellular telephone networks can be targeted geographically, although today's methods for doing so are quite limited and imprecise. In the case of IS-136 cellular systems, for example, the digital control channels (DCCs) of each cell carry broadcast traffic. Thus, the reach of a broadcast message can be restricted cell-by-cell, simply by choosing to send the broadcast message or not on a particular DCC. Further, cells are often divided into sectors in order to exploit the properties of directional base-station antennas, thereby opening the possibility of sector-by-sector geographic resolution for broadcast messages.

Nevertheless, a cell or sector has a large coverage area, typically on the order of ten-to-twenty kilometers in radius. Consequently, there remains a need to improve the geographic resolution by which broadcast messages can be targeted to the users of communication networks, particularly to the users of mobile communication networks

such as cellular telephone networks, so that users receive only information that is of concern to them. An improvement in broadcast resolution based on geographic location would open the possibility of finely targeted advertisements and other commercial activities directed toward mobile users, as well as finely targeted reports and alerts concerning topics of a public-interest nature such as traffic accidents or road congestion, man-made or natural disasters of limited geographic import, fire and police actions, restricted-activity areas such as blasting zones, severe weather warnings, and so forth.

Summary of the Invention

The present invention improves the geographic resolution by which messages can be targeted to communication terminals, which is particularly important when broadcast messages are sent over a wireless network to a population of mobile users.

According to the present invention, a target area of reception is specified for a message. The target area can be specified, for example, by the radius and center coordinates of a geographic circle. The target area of reception is compared to location data stored in the receiving terminal. When the location stored in the terminal falls within the target area of reception, the communication terminal accepts the messages. Conversely, when the location stored in memory falls outside the target area of reception, the communication terminal does not accept the message.

In one embodiment of the invention that is particularly beneficial to users of wireless networks, the current location of a mobile terminal is determined by a positioning receiver such as a global positioning system GPS receiver that is operably connected to the mobile terminal. Logic within the mobile terminal compares the

terminal location with the target area of reception. When the terminal location lies within the target area of reception, the mobile terminal accepts the message. When the terminal location lies outside target area of reception, the mobile terminal does not accept the message.

In another embodiment of the invention, location data is predetermined and stored within the terminal by manual or automatic entry into a memory, so that the location data can define a location of interest other than the communication terminal's current geographic location, or so that terminal location can be provided for terminals that lack a positioning receiver, for example cellemetry equipment, personal computers equipped with wireline modems, and so forth.

These and other aspects of the present invention will become apparent to those skilled in the art after a reading of the following description of the preferred embodiments when considered with the drawings.

Brief Description of the Drawings

Figure 1 is a schematic diagram of a communication network for sending targeted messages to mobile communication terminals.

Figure 2 is a block diagram of a mobile communication terminal that receives the targeted message.

Figure 3 shows the format of a targeted message.

Figure 4 shows the data structure for the location data stored in the mobile communication terminal.

Figure 5 is a flow diagram showing the process for constructing a targeted message that has the format described in Figure 3.

Figure 6 is a flow diagram showing the operation of the communication terminal upon receipt of a targeted message having the format shown in Figure 3.

Detailed Description of the Invention

Referring now to the drawings, a system and method for transmitting geographically targeted messages will be described. The disclosed embodiment is used in a mobile communication system. However, the invention may be used in other types of communication networks, such as wireline networks.

The mobile communication system, which is indicated generally by the numeral 10, comprises a plurality of base stations 12 which are connected via a mobile services switching center (MSC) 14 to a terrestrial communications network such as the Public Switched Telephone Network (PSTN) 16. Each base station 12 is located in and provides service to a geographic region referred to as a cell. In general, there is one base station 12 for each cell within a given network. Within each cell, there may be a plurality of mobile communication terminals 100 that communicate via radio link with the base station 12. The base station 12 allows the user of the mobile communication terminal 100 to communicate with other mobile communication terminals 100, or with users connected to the PSTN 16. The mobile services switching center 14 routes calls to and from the mobile communication terminal 100 through the appropriate base station 12. Information concerning the location and activity status of the mobile communication terminal 100 is stored in a database which is connected to the MSC 14 so that the network can route communications to the base station that is currently servicing the mobile communication terminal 100. In this

illustration, the communication network 10 is a digital cellular telephone network such as a network that operates according to TIA Standard IS-136.

A message such as a text message that is to be transmitted to communication terminals 100 in a targeted geographic area is provided by a message source 20. The message source 20 also provides target area data along with the message. The message source 20 may be external to the communication network 10 or may reside within the communications network 10. If the message source resides outside of the communication network 10, the message is passed from the message source 20 to the network gateway 18, which formats the text into a message as described below for transmission over the communication network 10. The message can be formatted at other locations within the network 10. In one embodiment, the message is routed through the network 10 to the appropriate base station(s) 12 serving cells that cover the targeted geographic area. Alternatively, the message can be broadcast throughout the entire network. The targeted geographic area may lie entirely within a cell, or may occupy portions of two or more cells. The targeted message is transmitted by the base station(s) 12 to all mobile communication terminals 100 in the selected cells. All mobile terminals 100 receiving the message will determine whether to accept the message based on the target area data associated with the message.

Figure 2 is a block diagram showing one embodiment of the mobile communication terminal 100. The mobile communication terminal 100 shown in Figure 2 is a fully functional radio transceiver capable of transmitting and receiving digital signals. Those skilled in the art will recognize, however, that the present invention may be implemented in an analog transceiver. The mobile communication terminal 100 includes a control unit or logic unit 102, an operator interface 104, a

transmitter 120, a receiver 140, a memory 150, and a positioning receiver 160, and a position memory 170.

The operator interface 104 includes a display 106, keypad 108, control unit 110 microphone 112, speaker 114, alarm 116, and speech synthesizer 118. The display 106 allows the operator to see dialed digits and call status information. The keypad 108 allows the operator to dial numbers, enter commands, and select options. The control unit 110 interfaces the display 106 and keypad 108 with the control unit 102. The microphone 112 receives audio signals from the user and converts the audio signals to analog signals. Speaker 114 converts analog signals from the receiver 140 to audio signals that can be heard by the user. The alarm 116 produces an audible tone to notify the user in case of receipt of an urgent message. The speech synthesizer 118 converts text messages to an audible signal that can be played back through the speaker 114.

The analog signals from the microphone 112 are applied to the transmitter 120. The transmitter 120 includes an analog-to-digital converter 122, a digital signal processor 124, and a modulator 126. The analog to digital converter 122 changes the analog signals from the microphone 112 into a digital signal. The digital signal is passed to the digital signal processor 124. The digital signal processor 124 compresses the digital signal and inserts error detection, error correction and signaling information. The compressed and encoded signal from the digital signal processor 124 is passed to the modulator 126. The modulator 126 converts the signal to a form that is suitable for transmission on a RF carrier.

The receiver 140 includes a demodulator 142, a digital signal processor 144, and a digital to analog converter 146. Received signals are passed to the demodulator

142 which extracts the transmitted bit sequence from the received signal. The demodulator 142 passes the demodulated signal to the digital signal processor 144 which decodes the signal, corrects channel-induced distortion, and performs error detection and correction. The digital signal processor 144 also separates control and signaling data from speech data. The control and signaling data is passed to the control unit 102. Speech data is processed by a speech decoder and passed to the digital-to-analog converter 146. The digital-to-analog converter 146 converts the speech data into an analog signal which is applied to the speaker 114 to generate audible signals which can be heard by the user.

The control unit 102, such as a programmed microprocessor, functions to coordinate the operation of the transmitter 120 and the receiver 140. Memory 150 stores the program instructions and data needed by the control unit 102 to control the communications terminal 100. The functions performed by the control unit 102 include power control, channel selection, timing, as well as a host of other functions. The control unit 102 inserts signaling messages into the transmitted signals and extracts signaling messages from the received signals. The control unit 102 responds to any base station commands contained in the signaling messages, and implements those commands. When the user enters commands via the keypad 108, the commands are transferred to the control unit 102 for action.

The positioning receiver 160 receives signals from a space-based or land-based station that transmits positioning data. For example, the positioning receiver 160 could be a GPS receiver. The received data is passed to the control unit 102 which uses the information to calculate the geographic location of the communication terminal 100. The location is then stored in the position memory 170. The position

memory 170 can be an operational register within the control unit 102 or an address space in memory 150. The position memory 170 could also be a separate RAM or ROM memory.

Referring now to Figures 3 – 6, the method for transmitting and receiving geographically targeted messages to communication terminals 100 will be described. Figure 3 shows the format of a targeted message 200 that includes the text provided by the message source 20. The message 200 comprises a transmission header 205, a message field 210, and a trailer 215. The transmission header 205 includes a From Address field 220, which identifies the message source 20, a To Address field 225, which identifies the communication terminal 100 intended to receive a message 200 that is addressed individually rather than broadcast, a Broadcast Indicator field 230, which marks the message 200 as a broadcast or non-broadcast message, a Broadcast Group Code field 235, which identifies a broadcast group intended to receive a broadcast message, a Target Indicator field 240, which marks the message 200 as containing a target area of reception or not, and a Target Area of Reception field 250, which specifies a geographic area for which the message 200 has relevance. The Target Area of Reception field 250 includes a Center field 252, which specifies the latitude and longitude of the center of a circular geographic area, and a Radius field 254, which specifies the radius of the circular geographic area.

The particular choice and arrangement of fields described in the context of Figure 3 illustrate one possible embodiment and is not intended to be limiting. Those skilled in the art will realize that the invention can be carried out with other choices and arrangements of the same or similar fields. In particular, the To Address field 225 can be re-used as the Broadcast Group Code field 235, with the contents of the field

differentiated by setting the value of the Broadcast Indicator field 230. Moreover, the Target Area of Reception field 250 can be described in a number of other ways, for example by defining the vertices or edges of a geographic polygon, or by specifying the center of the target area of reception and using a pre-agreed value for its radius, or by specifying its size and using a default center, or by specifying the longitude and latitude of the boundaries of a region, and the like.

Figure 4 is an illustration of the location data 290 which is stored in the position memory 170. The location data represents a reference location used for comparison to the targeted geographic area. The location data includes a latitude field 292 and a longitude field 294 or fields for carrying equivalent information for other geometric forms. Normally, the reference location will be the geographic location of the communication terminal 100 itself. However, if it is desired to monitor messages directed to a location remote from the communication terminal 100, location data for the remote location can be loaded into this field. In the preferred embodiment, the location data 290 is determined by the positioning receiver 160 and loaded into the position memory 170 as previously described. Alternatively, the location data 290 can be loaded manually into the position memory 170 through the keypad 108 or entered automatically into the position memory 170 over a communication link provided by the receiver 120. The later two embodiments are particularly useful to define a reference location other than the current location of the communication terminal 100, and also to extend the usefulness of the invention to encompass communication terminals 100 that lack a positioning receiver 160, for example cellemetry equipment, computers equipped with wireline modems, and so forth.

Figure 5 illustrates a method for constructing the targeted message 200 shown in Figure 3. At the top of Figure 5, the message source 20 transfers a text message, such as a road-congestion alert, to be placed in the message field 210 of the message 200, together with ancillary information needed to construct the other fields of the message 200 (step 300). The message can be formatted at any location in the network, such as the gateway 18 or the MSC 14. When the message 200 is to be broadcast rather than addressed individually, the ancillary information specifies the contents of the Broadcast Group Code field 235. When the message is to be addressed individually rather than broadcast, the ancillary information specifies the contents of the To Address field 225. When the message is to be targeted geographically, the ancillary information specifies the contents of the Target Area of Reception field 250.

When the message 200 is to be individually addressed rather than broadcast, the Broadcast Indicator field 230 of the message 200 is set to binary zero (step 310). When the message 200 is to be broadcast rather than individually addressed, the Broadcast Indicator field 230 of the message 200 is set to binary one (step 320). When the message is not geographically targeted, i.e., the ancillary information does not include information to be loaded into the Target Area of Reception field 250 of the message 200, the Target Indicator field 240 of the message 200 is set to binary zero (step 330). When the message is geographically targeted, the Target Indicator field 240 of the message 200 is set to binary one (step 340).

The message 200 is then constructed according to the format of Figure 3 by loading the ancillary data into the appropriate message fields shown in Figure 3 (block 350). When the broadcast flag 230 is on (i.e., Broadcast Indicator field is set to "1"),

information regarding the intended broadcast group is loaded into the Broadcast Group Code field 235 of the message 200. When the broadcast flag 230 is off (i.e.,Broadcast Indicator field is set to "0"), information regarding an individual address is loaded into the To Address field 225 of the message 200. When the target flag 240 is on (i.e.,Target Indicator field is set to "1"), information regarding the target area of reception is loaded into the Target Area of Reception field 250 of the message 200. When the target flag 240 is off (i.e.,Target Indicator field is set to "0"), the Target Area of Reception field 250 of the message 200 is left blank. The remainder of the message 200 is conventionally constructed (step 360) according to the formats and protocols of the communication network 100 employed, and the message 200 is passed to the base station 12 for transmission to the communication terminal 100 (step 370). The next message transfer is awaited (step 380).

Figure 6 illustrates the procedure for handling messages received by the communication terminal 100. The message 200 is received, demodulated and decoded by the receiver 120, and then passed to the control unit 102 for processing (step 400). The control unit 102 initially examines the Broadcast Indicator field 230 of the message 200 (step 405) to determine whether the message is a broadcast message. When the broadcast flag 230 is on, the control unit 102 compares the contents of the Broadcast Group Code field 235 to a list of broadcast group codes held in the memory 150, in order to determine whether the communication terminal 100 has membership in the specified broadcast group (step 410). If the communication terminal 100 is not a member of the specified broadcast group, the control unit 102 instructs the communication terminal 100 to await the arrival of the next message (step 450) and ceases processing of the current message. If the communication

terminal 100 is a member in the indicated broadcast group, the control unit 102 examines the Target Indicator field 240 (step 420).

When the target flag 240 is off, the control unit 102 instructs the communication terminal 100 to process the message 200 conventionally (step 425), and then to await the arrival of the next message (step 450). When the target flag 240 is on, the control unit 102 queries the position memory 170 to obtain the location data 290 (step 430). The control unit 102 then compares the location data 290 to the contents of Target Area of Reception field 250 to determine whether the refernce location falls within the targeted geographic region (step 435). The targeted geographic region is defined by the contents of the Target Area of Reception field 250. If not, the control unit 102 instructs the communication terminal 100 to disregard the message 200 (step 440) and the communication terminal 100 awaits the arrival of the next message (step 450).

If the reference location falls within the geographic area specified by the Target Area of Reception field 250, the control unit 102 instructs the communication terminal 100 to process the message 200 as described below (step 445). The communication terminal 100 then awaits the arrival of the next message (step 450).

When the broadcast flag 230 is found to be off in step 405, the control unit 102 examines the contents of the To Address field 225 of the message 200 (step 415). If the message 200 is not addressed to the communication terminal 100, the communication terminal 100 awaits the arrival of the next message (step 450) rather than to consider the current message any further. If the message 200 is addressed to the communication terminal 100, the control unit 102 examines the Target Indicator field 240 and proceeds as described above (step 420).

Processing the message 200 in step 445 means any action taken by the mobile terminal in response to the received message 200. For example, processing the message may comprise displaying the text of the message 200 on the display 106, transducing the text of the message 200 to audible form by use of the speech synthesizer 118 and playing the result on the speaker 114, announcing the arrival of the message 200 by the audio alarm 116, storing the message 200 in the memory 150 for later use, and the like. Also, those skilled in the art will recognize that the targeted message may comprise a signaling message used for network management and that the processing of the message 200 can occur without user knowledge.

By accepting and processing the message 200 only selectively, based on comparing geographic information carried by the Target Area of Reception field 250 with the terminal location data 290, rather than accepting and processing all incoming messages indiscriminately, the present invention improves the geographic resolution by which messages can be targeted to communication terminals 100, which is particularly important when broadcast messages are sent over a wireless network to a population of mobile users.

Although the present invention has been described in connection with a digital cellular telephone network filling the role of the communication network, the invention is not limited to such use, and applies to all kinds of communication networks, both wireline and wireless, including, but not limited to, communication networks such as satellites networks, private radio networks such as those used by police organizations, wide-area and metropolitan-area telecommunication networks such as wireline digital telephone networks with data communication capabilities, local-area networks, private corporate networks, and the like. The communication

terminals can be radio transceivers with digital message capability, personal computers or personal digital assistants equipped with wireline or wireless modems, ISDN adapters, DSU/CSU adapters, and the like. In the later instances, the communications terminal 100 would, of course, be replaced by a modem having the characteristics needed by the particular choice of communication network.

Additionally, the invention may be carried out in specific ways other than those set forth herein without departing from the spirit and the essential characteristics of the present invention. Consequently, the present embodiments are to be construed in all aspects as illustrative and not restrictive. All changes coming within the meaning and equivalence range of the appended claims are intended to be embraced by these claims.

I claim:

1. A method for transmitting a targeted message from a transmitting terminal to a receiving terminal comprising:

transmitting from a transmitting station a message and associated target area data that specifies a targeted geographic area for the message;

receiving the message and corresponding target area data at a receiving terminal;

establishing a reference location;

determining whether the reference location is within said targeted geographic area based on said target area data; and

processing the message if the reference location is within said targeted geographic area.

2. The method of claim 1 further including storing location data representing the reference location in a memory at said receiving terminal.

3. The method of claim 2 wherein the location data is input manually into said receiving terminal.

4. The method of claim 2 wherein the location data is determined based on data from a positioning receiver operatively connected to the receiving terminal.

5. The method of claim 2 wherein the location data is transmitted to said receiving terminal from a remote location.

6. The method of claim 2 wherein the reference location is the location of the receiving terminal.

7. The method of claim 2 wherein the reference location is a location remote from the receiving terminal.

8. The method of claim 2 wherein the determining step includes storing location data at said receiving station and comparing said location data with said target area data.

9. A communication terminal for selectively receiving a transmitted message comprising:

a receiver for receiving a transmitted message and associated target area data that specifies a targeted geographic area for the message;

a memory for storing location data representing a reference location;

a control unit for determining whether the reference location is in said targeted geographic area based on said target area data and processing said message based on the outcome of said determination.

10. The communication terminal of claim 9 further including input means for inputting said location data.

11. The communication terminal of claim 10 wherein input means comprises a positioning receiver operatively connected to said control unit.

12. The communication terminal of claim 11 wherein the positioning receiver is a global positioning system receiver operatively connected to said control unit.

13. The communication terminal of claim 10 wherein the input means comprises a keypad operatively connected to said control unit.

14. The communication terminal of claim 9 wherein the location data is received from a remote location via said receiver.

15. A communication system for transmitting geographically targeted messages comprising:

a. a transmitting terminal for transmitting a targeted message and associated target area data;

b. at least one receiving terminal for receiving the targeted message and said target area data transmitted from said transmitting terminal; and

c. control means associated with said receiving terminal for determining whether to accept the targeted message based on said target area data.

16. The communication system of claim 15 wherein said receiving terminal includes a memory for storing location data representing a reference location for use by said control unit to determine whether the communication terminal is in said targeted geographic area.

17. The communication system of claim 15 wherein said receiving terminal includes input means for inputting said location data.

18. The communication system of claim 17 wherein the input means comprises a positioning receiver operatively connected to said receiving terminal.

19. The communication system of claim 18 wherein the positioning receiver is a global positioning system receiver operatively connected to said control unit.

20. The communication system of claim 17 wherein the input means comprises a keypad operatively connected to said control unit.

21. The communication system of claim 16 wherein the location data is received at said receiving terminal from a remote location.

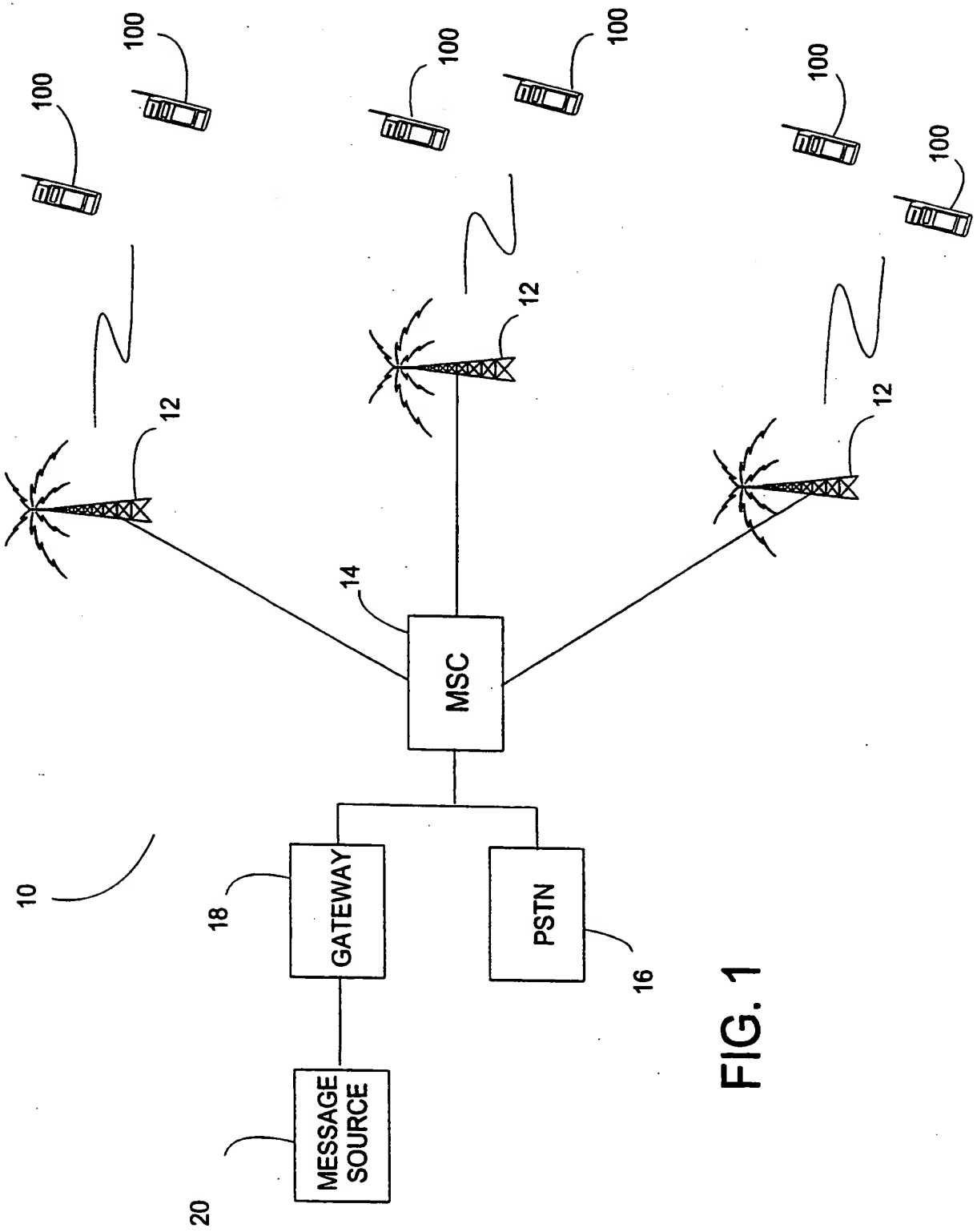


FIG. 1

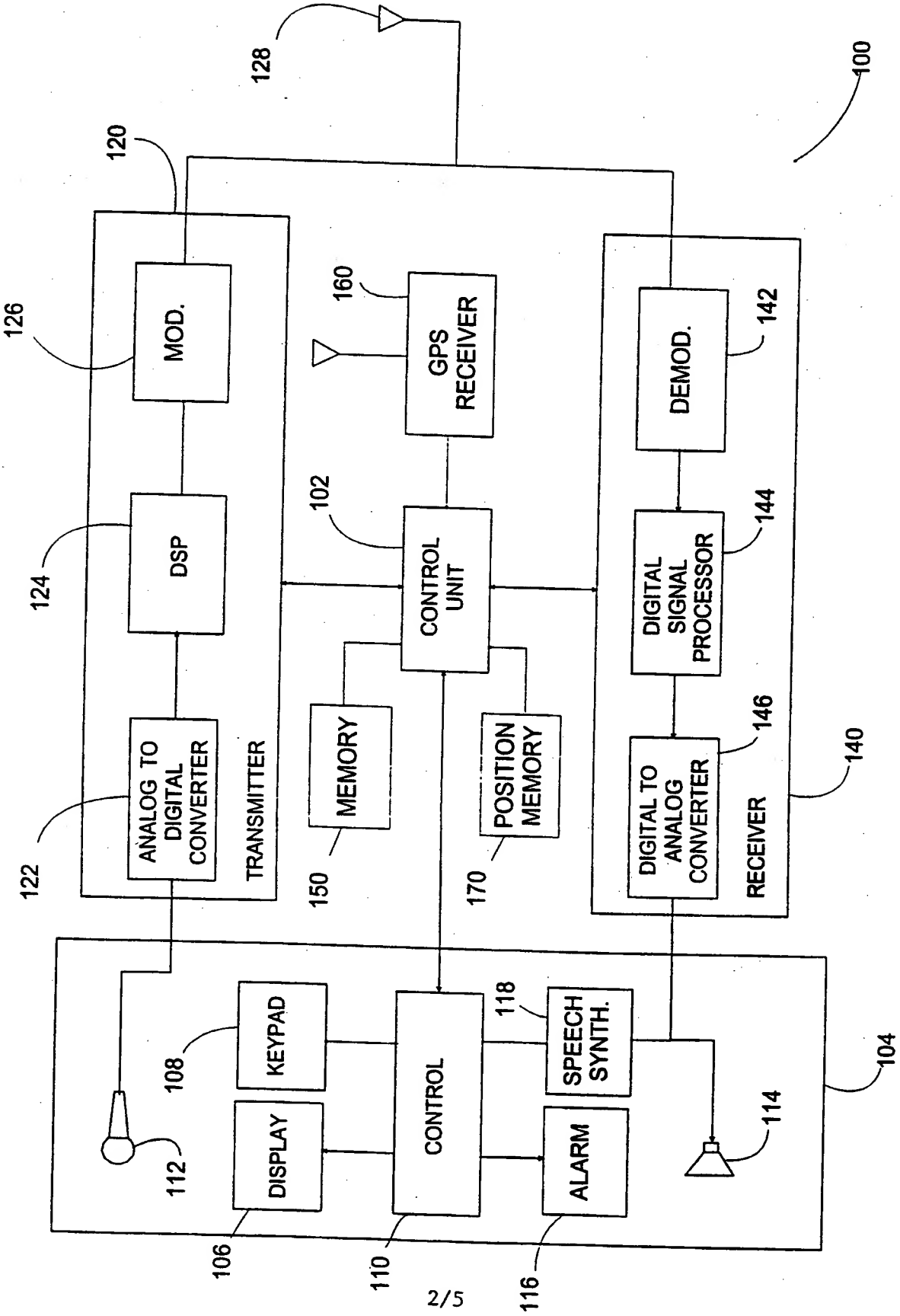


FIG. 2

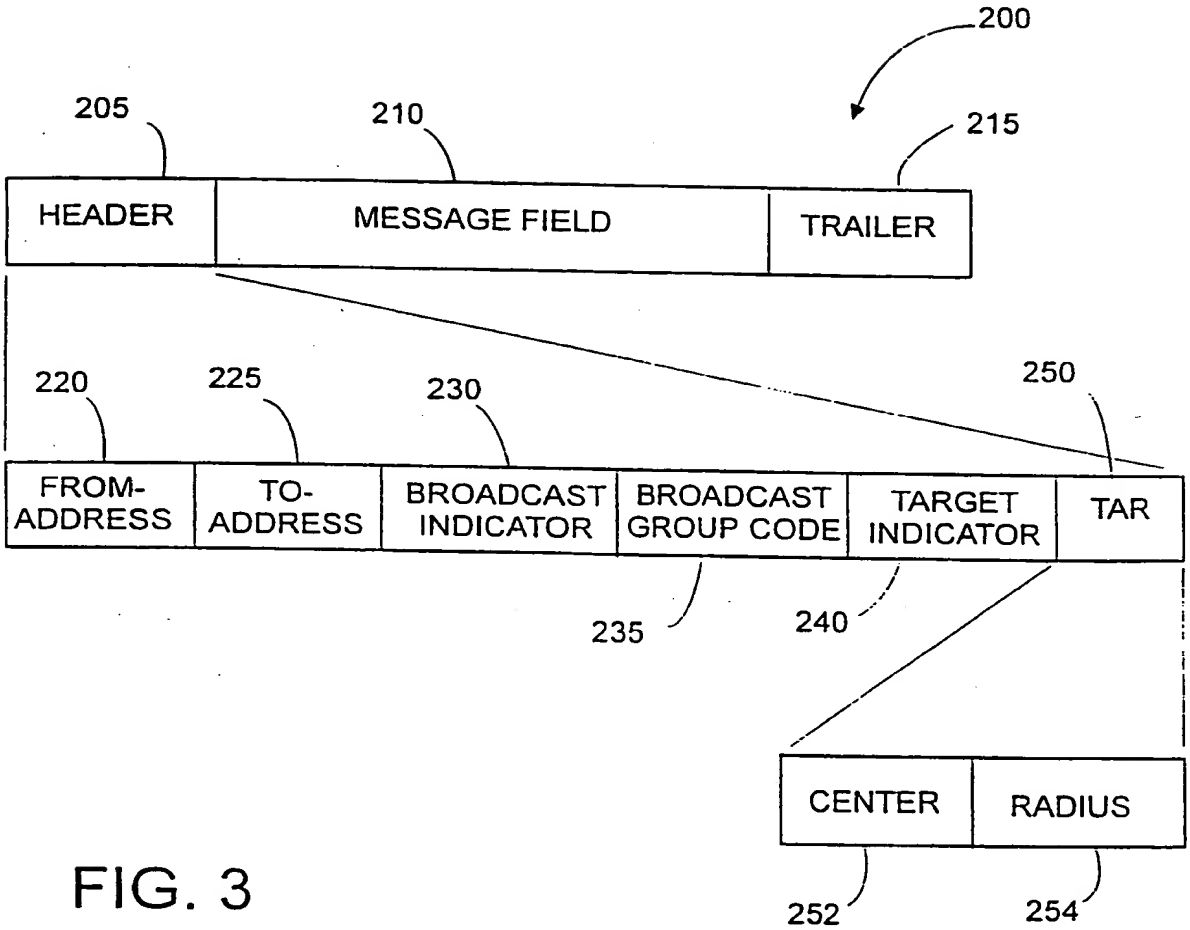


FIG. 3

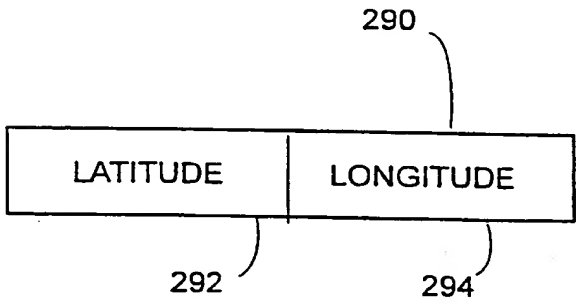


FIG. 4

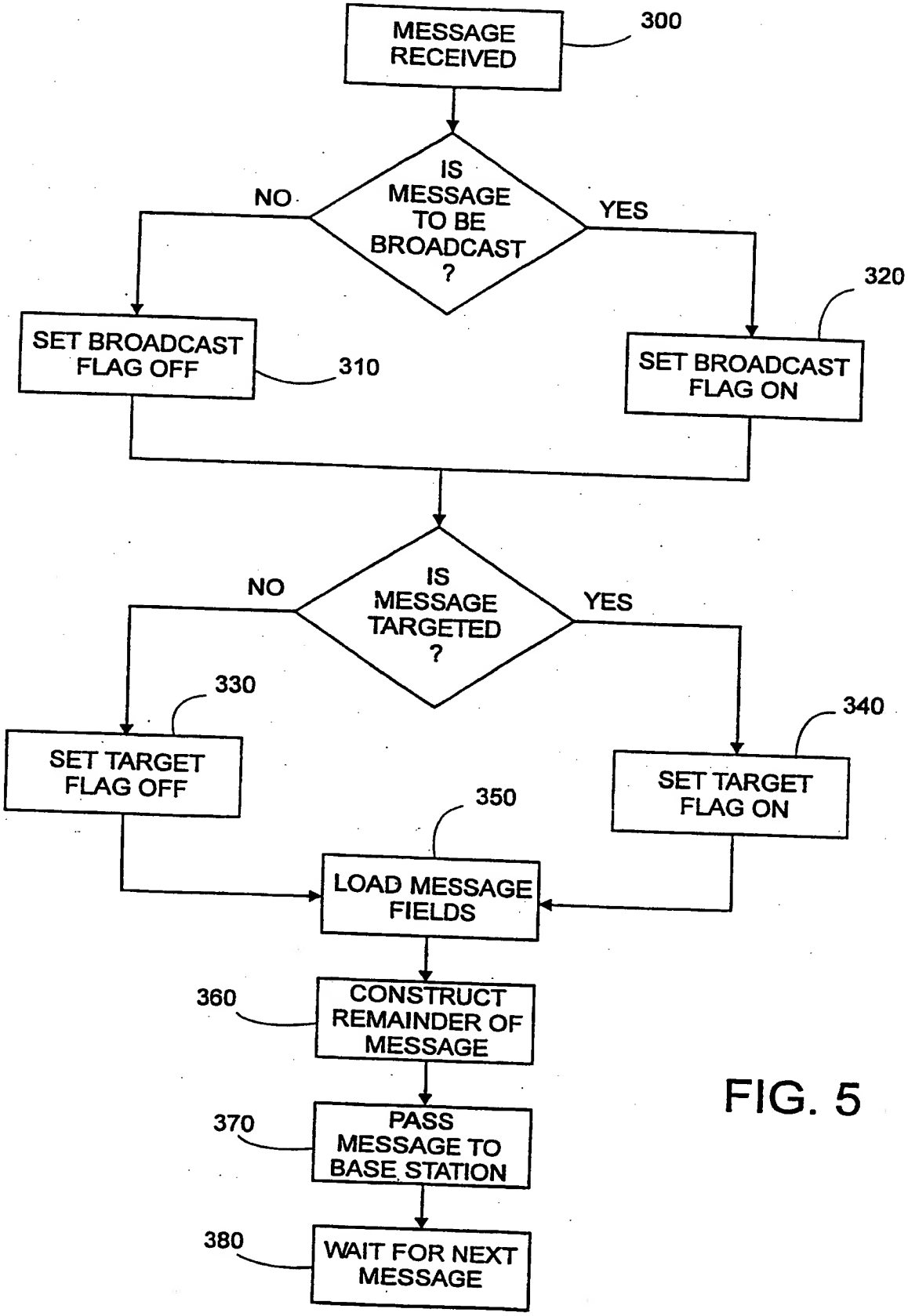


FIG. 5

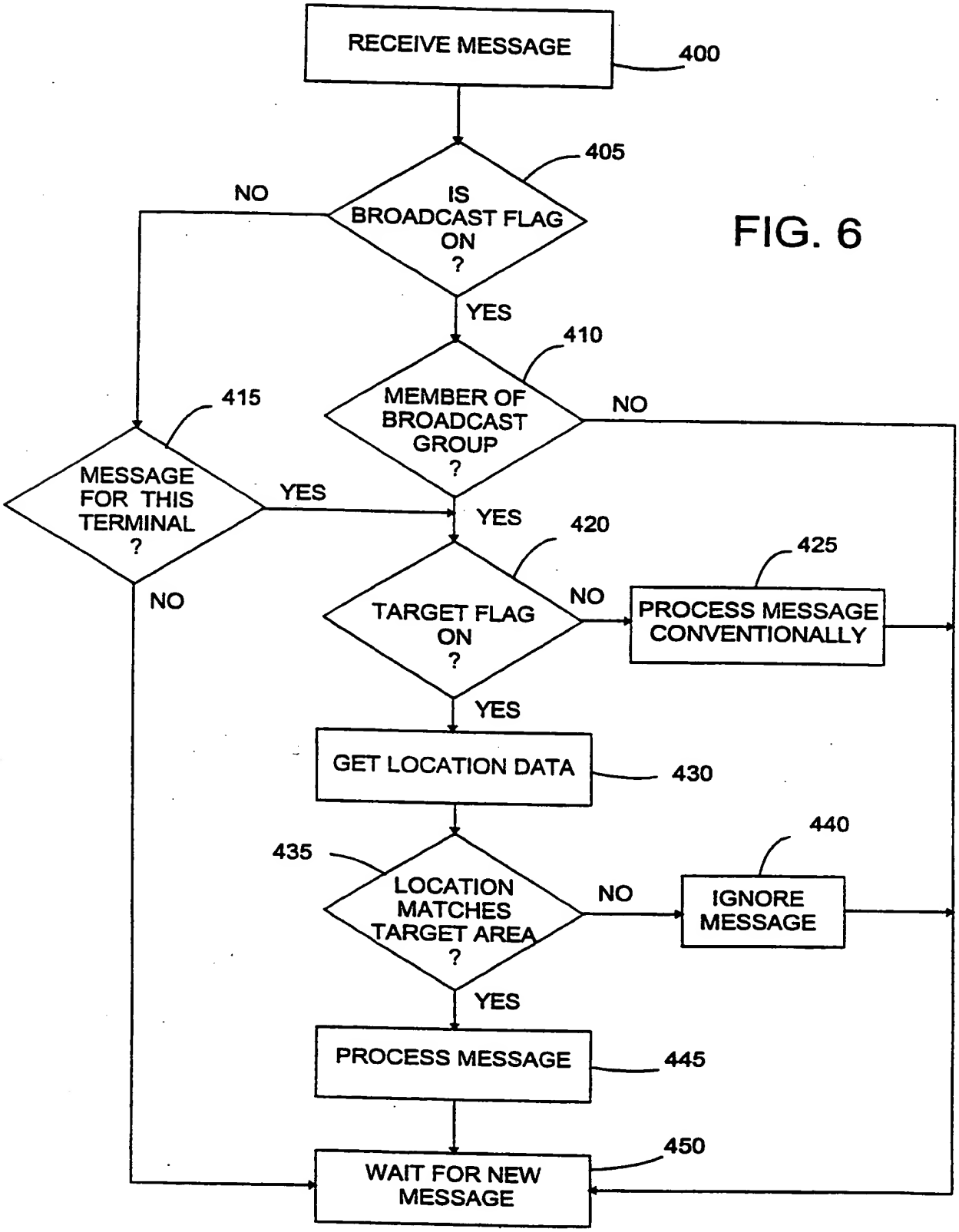


FIG. 6

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/26045

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 05678 A (MITRE CORP) 22 February 1996 (1996-02-22) page 5, line 2 - line 12 page 9, line 13 - line 21 page 6, line 15 - line 20 page 7, line 19 -page 8, line 6	1-4, 6-13, 15-20
X	DE 196 05 632 A (AEG MOBILE COMMUNICATION) 21 August 1997 (1997-08-21) page 2, line 24 - line 26 page 2, line 51 - line 56 page 3, line 23 - line 28 page 3, line 66 -page 4, line 14	1,2,4-6, 8,9,11, 12, 14-16, 18,19,21

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 February 2000	02/03/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Kampouris, A

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte. ional Application No
PCT/US 99/26045

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9605678 A	22-02-1996	US 5636245 A	03-06-1997
		CA 2197080 A	22-02-1996
		EP 0775407 A	28-05-1997
		FI 970512 A	07-02-1997
		JP 10504392 T	28-04-1998
		NO 970578 A	24-03-1997
DE 19605632 A	21-08-1997	EP 0790747 A	20-08-1997
		NO 970724 A	18-08-1997